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American Woods

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American Basswood

Forest Service

U. S. DEPARTMENT OF AGRICULTURE

AMERICAN BASSWOOD

(*Tilia americana*)

By H. S. Betts, *senior engineer, Division of Forest Products*

Basswood is an important commercial timber tree growing in the eastern part of the United States. The wood is light in weight and color, has a fine uniform texture, and does not impart taste or odor. It is weak and lacks durability under conditions favorable to decay. Basswood lumber is used principally for food containers; venetian blinds; sash, doors, and general millwork; furniture; and dairy, poultry, and apiary supplies. The wood is also used in log form for the manufacture of veneer, headings for flour barrels, and excelsior.

Approximately 40 percent of the basswood lumber produced in recent years has come from Wisconsin and Michigan, and about 20 percent from West Virginia. The stands of timber formerly available in New York, Pennsylvania, and Ohio have been greatly reduced, and the annual production of basswood lumber has dropped to about one-quarter of the maximum which occurred in 1909.

The future of basswood depends upon provision for new growth. Basswood reproduces readily both from seed and by sprouting from the stump, grows rapidly and under favorable conditions sometimes reaches a height of 130 feet and diameter of 4 feet. Although basswood lumber is manufactured very largely from one species (*Tilia americana*), several of the other 16 botanical species of basswood make up a minor part of the cut. Of these, white basswood (*Tilia heterophylla*), which grows in the Appalachian Mountain region, is the most important. The wood of the different species is quite similar in appearance and properties and is not separated on the market.

Nomenclature.—Basswood is also known as linden, linn, white basswood, beetree, and limetree.

Distribution and growth.—Basswood grows throughout the eastern half of the United States and southeastern Canada. Its range in the United States extends from Maine westward into North Dakota and southward into Florida and eastern Texas (fig. 1). Basswood grows in mixture with other species and does not form pure stands. It occurs under a wide variety of conditions of soil and climate. The tree thrives in coves and flats and in low land near streams where the soil is a rich, deep, sandy loam and under climatic conditions that obtain in the northern parts of its range. Under favorable conditions forest-grown trees often reach a diameter of 3 feet and height of 90 feet. At 20 years the average diameter is about 2.7 inches and the average height about 27 feet, and at 50 years about 7.6 inches and 57 feet, respectively. When crowded, basswood forms a straight stem but if grown in the open, the stem is short and there are many large branches.

Basswood is easily propagated. It sprouts readily from the stump, and the sprouts generally grow more rapidly than seedlings. The tree does not suffer severe injury from insect attack. Cattle like to browse the twigs and leaves and must be excluded from young growth if satisfactory reproduction is to be obtained. Large trees frequently have hollow butt logs due to internal decay.

Supply.—The total stand of basswood was estimated in 1922 [1] at 9,012,000,000 board feet. Of this amount, over half was in the Lake States and about one-quarter in the central region where the greatest producing States are West Virginia, Tennessee, and Kentucky. New England was estimated to contain 7 percent of the basswood stand, and New York, Pennsylvania, New Jersey, Delaware, and Maryland combined about the same amount. Only about 5 percent of the stand was placed in the South Atlantic and Gulf States.

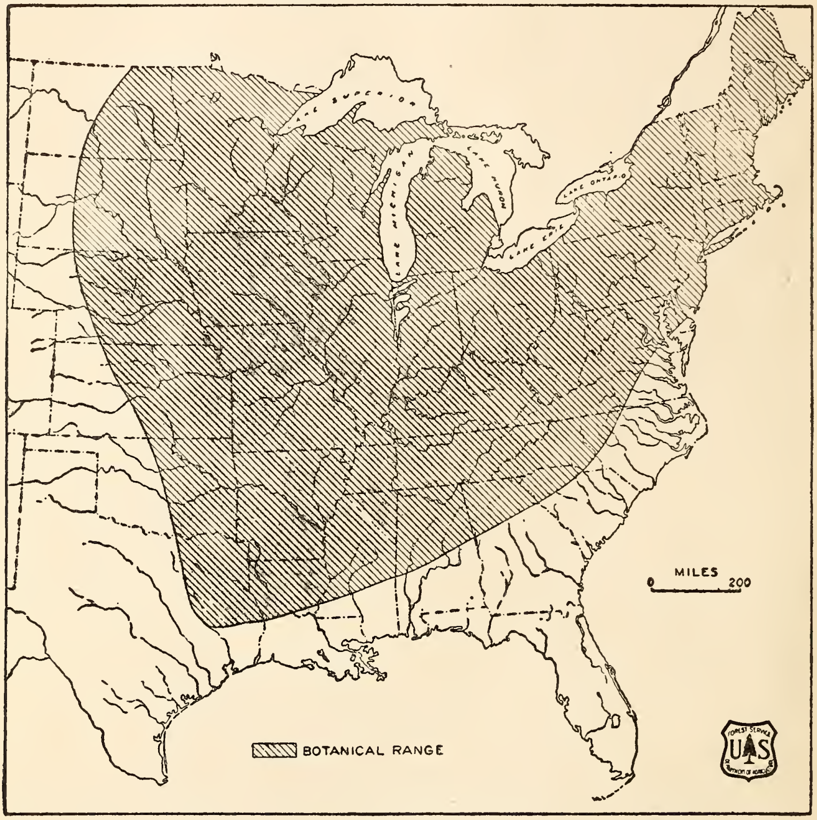

FIGURE 1.—Range of American basswood (*Tilia americana*).

An estimate made in 1931 [2] placed the stand of basswood in the Lake States region at approximately 2,500,000,000 board feet. A forest survey of the Lake States completed in 1938[3] showed the stand of basswood saw timber to be 2,039,200,000 board feet. Of this, 828,000,000 feet was in Wisconsin, 760,000,000 feet in Michigan, and 451,200,000 feet in Minnesota. If it is still considered, as in the 1922 estimate, that approximately one-half of the stand is in the Lake States, then the total basswood saw timber in the United States would be approximately 4,078,000,000 board feet.

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[1] See BRUSH, W. D. UTILIZATION OF BASSWOOD. U. S. Dept. Agr. Bul. 1007, 64 pp. illus. 1922.

[2] Based on data collected by the U. S. Forest Service for a report on A NATIONAL PLAN FOR AMERICAN FORESTRY. 73d Cong., Senate Doc. 12, 2 v., 1677 pp. 1933.

Production of lumber.—In 1899[4] the reported production of basswood lumber was 309,399,000 board feet (fig. 2). By 1909 it had risen to a maximum of 399,151,000 board feet. Since then it has fallen irregularly. The minimum of 21,258,000 board feet was reached in 1932—a year of business depression. In 1942 the reported cut was 133,438,000 board feet. It came from 33 States. The average yearly cut of basswood lumber for the 10-year period 1933–42 was 86,800,000 board feet. Wisconsin has been the leading State in the production of basswood lumber since 1899 except in 1941 and 1942 when West Virginia held first place. Michigan has generally ranked second and West Virginia third. The combined production of the three States in 1942 was approximately 55 percent of the total cut of basswood lumber. West Virginia and Wisconsin each furnished over 20 percent of this total.

Veneer.—For the period 1904–37 the consumption of basswood logs for veneer varied from a minimum of 5,977,000 board feet log scale in 1921 to a maximum of 15,659,000 feet in 1906. In 1937 it was 11,723,000 feet. In 1943 the consumption of basswood veneer logs was 9,857,000 feet and in 1944, 10,176,000 board feet, log scale, equivalent to 11,702,000 board feet, lumber tally.[5]

Cooperage.—The production of basswood cooperage stock is confined largely to slack heading. In 1906 over 15,000,000 sets were produced. In 1931[6] production dropped to 787,000 sets. In the period 1921–31, inclusive, the average annual production was about 1,800,000 sets. Present annual production of basswood slack heading is estimated at 1,500,000 sets, equivalent to 3,000,000 board feet.[7] Considerably smaller but indeterminate amounts go into slack staves and into tight staves and heading. A rough estimate for the total annual production of basswood cooperage stock in recent years is 4,000,000 board feet.

Excelsior.—In 1911 the consumption of basswood for excelsior amounted to 33,042 cords. Since then it has decreased irregularly and in 1937 was 5,520 cords out of a total, for all species, of 131,083 cords. The average annual consumption of basswood for excelsior for the 4 years 1927, 1929, 1935, and 1937 was approximately 11,000 cords, equivalent to 5,500,000 board feet.

Pulpwood.—The amount of basswood used for pulpwood has not been recorded separately since 1924. Before 1924 consumption varied from a maximum of 12,136 cords in 1922 to a minimum of 3,807 cords in 1917. The average annual consumption for the years 1922, 1923, and 1924 was approximately 10,000 cords. Consumption of basswood pulpwood in recent years is undoubtedly much less and is estimated at 5,000 cords, equivalent to approximately 2,500,000 board feet.

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[3] CUNNINGHAM, R. N., and MOSER, H. C. FOREST AREAS AND TIMBER VOLUMES IN THE LAKE STATES. U. S. Forest Serv. Lake States Forest Expt. Sta. Rpt., 84 pp., illus. 1938.

[4] The first year for which separate statistics for basswood are available.

[5] The overrun in converting feet log scale to board feet is considered to be 15 percent.

[6] Latest year for which cooperage statistics by species are available.

[7] Each set of slack heading considered equivalent to 2 board feet.

The average annual consumption of basswood in recent years for all purposes is estimated roughly at 115,000,000 board feet.

Properties.—The heartwood of basswood is pale yellowish brown with occasional darker streaks. The wide sapwood is creamy white or pale brown and merges more or less gradually into the darker heartwood. The growth rings are fairly distinct on a smooth cross section. The wood is soft and light in weight,[8] has a fine, even texture, is straight-grained, and easy to work with tools. It has a large shrinkage in drying. In ease of drying (kiln or air) it ranks with sugar maple, black walnut, and yellow poplar. When dry, the wood is without odor or taste. Basswood is weak and low in shock resistance. It does not split easily in nailing but is low in nail-holding ability and in resistance to decay. In the latter respect it is classed with aspen, cottonwood, and white fir. Basswood takes and holds paint well and can be easily glued. It shows stenciling or printing to good advantage. When pulped by the soda process, basswood yields a soft, short-fibered, easily bleached pulp.

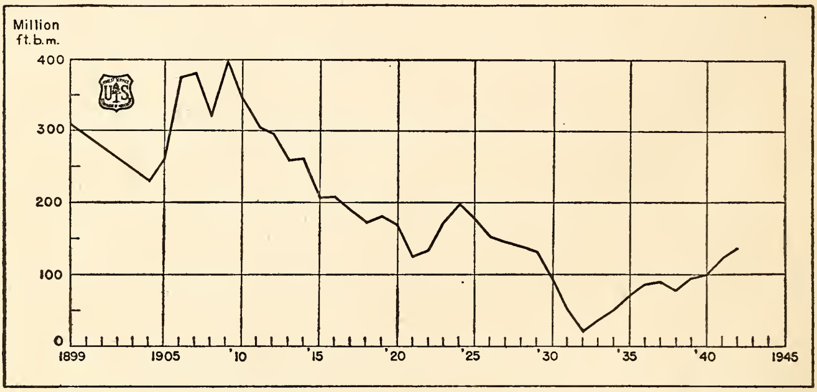

FIGURE 2.—Lumber production of basswood (*Tilia* species), 1899–1942.

Principal uses.—Basswood is used mainly in the manufacture of products made from lumber, such as boxes, venetian blinds, sash, doors, picture frames and molding, apiary supplies, furniture, woodenware, trunks and valises, and to a less extent for veneer, cooperage, excelsior, and pulpwood. The uniform, close texture of the wood, its ability to stay in place after seasoning, and its paint-holding ability have made basswood a preferred wood for venetian blinds. Another exacting use is for honey sections to hold comb honey for which a white wood without taste or odor is required. White basswood from the Allegheny Mountains has proved especially satisfactory. Other specialty uses are candy pails and cracker, candy, and tobacco boxes; flour-barrel headings, cheese boxes, high-grade excelsior, washboards, and ironing boards. In these uses light weight, light color, and freedom from taint are again requirements. Stained basswood is used as a substitute for

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[8] The average weight of basswood in an air-dry condition (12 percent moisture) is 26 pounds per cubic foot.

Spanish cedar, the standard cigar-box wood. The imitation is made even more complete by passing the thin lumber between rollers which stamp it to give the appearance of the genuine cedar. The cedar odor is imparted by washing the stained pieces with extract of cedar shavings and sawdust.

Basswood veneer is made almost entirely by the rotary process in which the log is revolved against an advancing knife. Sheets of veneer are glued together to form plywood panels used for drawer bottoms and mirror backing. Thick basswood veneer is used for core stock on which thin veneers of cabinet woods, such as black walnut and mahogany, are glued.

The use of basswood in cooperage is confined largely to flour-barrel headings. The clean appearance of the wood combined with lack of taste and odor makes it a preferred material for this purpose. It is not suitable for barrels to hold heavy materials.

Basswood is used for the highest grade excelsior, as it meets the requirements for a wood light in weight and color, soft, straight-grained, free from odor, and capable of being shaved into tough, resilient thin strands. In making excelsior, bolts about 18 inches long are used. They are first scored by means of steel teeth. A slicing knife then shaves off the finished excelsior.

Basswood is used in limited and decreasing quantities as a pulpwood. It is pulped almost entirely by the soda process and produces a pulp used as a filler in book, magazine, and writing papers.

The fibrous inner bark (bast) of basswood is sometimes used for weaving chair seats, baskets, mats, etc. The bark is prepared by soaking in water which separates the annual layers into thin sheets. These are cut into strips of the required width for woven products.

The blossoms produce an abundance of nectar from which bees make choice honey. Forests of basswood are maintained in Europe as a source of honey.

Table 1 shows the amounts of basswood used in the manufacture of different classes of products in 1912, 1928, 1933, and 1940. It includes basswood in the form of lumber with much smaller amounts of logs and bolts, and veneer.

TABLE 1.—*Basswood used in the manufacture of wooden products*

[Thousands of board feet]

Products	1912	1928	1933	1940
Airplanes	----------	124	7	5
Agricultural implements	7,862	1,889	157	445
Boot and shoe findings	3,599	8	28	1,644
Boxes, baskets and crating	86,980	77,401	[1] 26,240	[1] 33,551
Boxes, cigar and tobacco	4,206	350	219	187
Butchers' blocks	----------	----------	----------	----------
Car construction and repair	5,149	561	33	24
Caskets and burial boxes	2,728	440	1,671	2,105
Conduits, pumps and wood pipe	----------	25	----------	----------
Dairy, poultry and apiary supplies	(2)	4,623	5,932	8,139
Dowels and skewers	[3] 168	----------	----------	----------
Electrical equipment	299	565	6	170
Fixtures	7,115	5,507	940	3,691
Flooring	(4)	(4)	----------	----------
Furniture	34,904	13,521	3,706	9,328
Handles	3,044	982	1,106	983
Instruments, musical	10,968	4,189	515	2,966
Instruments, professional and scientific	2,619	1,967	731	2,304
Ladders	(2)	(2)	130	695

See footnotes at end of table.

TABLE 1.—*Basswood used in the manufacture of wooden products*—Continued

Products	1912	1928	1933	1940
Laundry appliances	4,981	2,127	1,611	161
Machinery	1,825	146	12	100
Matches	[5] 5,575	1,400	150	---
Patterns and flasks	124	50	13	643
Pencils and penholders	(6)	---	10	---
Playground equipment	---	22	---	2
Plumbers' woodwork	245	---	---	---
Printing material	353	839	242	187
Radio and phonograph cabinets	(7)	(7)	162	1,347
Refrigerators	[8] 5,222	[8] 1,076	1,092	38
Rollers, shade and map	702	3,148	1,009	2,088
Sash, doors, general millwork	[9] 80,947	[9] 35,788	[10] 3,008	[10] 14,735
Sewing machines	310	18	5	84
Ship and boat building	959	449	439	150
Shuttles, spools, bobbins, looms	[11] 1,947	[11] 103	[11] 200	982
Signs, scenery, displays	100	128	960	366
Sporting and athletic goods	319	184	198	363
Surgical supplies	1	3	---	15
Tanks	5	---	---	---
Toothpicks	(12)	---	---	---
Toys	8,739	5,796	1,523	1,412
Trunks and valises	21,164	7,635	1,846	1,744
Vehicles, motor	(13)	1,393	112	445
Vehicles, nonmotor	6,418	2,494	306	309
Venetian blinds	(4)	(4)	(4)	19,950
Woodenware and novelties	[14] 60,064	8,373	2,607	5,622
Total	369,641	183,324	56,926	116,980

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[1] Figures for 1933 and 1940 include basswood used for boxes and crates by plants not classified as manufacturers of wooden products and which were not included in 1912 and 1928. The amounts included for nonmanufacturers of wooden products were as follows: 1933—5,027,000 board feet, and 1940—10,211,000 board feet.

[2] Included in "Woodenware and novelties."

[3] Does not include skewers.

[4] Included in "Sash, doors, general millwork."

[5] Includes "Toothpicks."

[6] Included in "Instruments, professional and scientific."

[7] Included in "Furniture."

[8] Includes kitchen cabinets.

[9] Includes planing-mill products such as flooring, siding, ceiling, etc.

[10] Planing-mill products not included in 1933 and 1940 canvasses as in 1912 and 1928 except flooring which is listed separately.

[11] Does not include looms.

[12] Included in "Matches."

[13] Included in "Vehicles, nonmotor."

[14] Includes "Dairy, poultry, and apiary supplies."

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